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[Title Of The Invention]

PRINTED WIRING BOARD CONNECTING DEVICE

[Abstract]

PURPOSE: To connect two patterns of printed wiring boards each other by an elastic force, by only inserting connection pins into the through holes of the printed wiring boards, and to connect the patterns each other without soldering, by placing the other side printed wiring board in the orthogonal condition to one side printed wiring board.

CONSTITUTION: The vertical parts 2c and 5c, or the horizontal parts 3c and 6c, of connecting pins 2, 3, 5, and 6 projecting from spacers 1 and 4, are soldered to a printed wiring board A, and the through holes B1 of the other printed wiring board B are brought close to the bending parts 2a, 3a, 5a, and 6a of the connecting pins projecting from the upper surface or the side surface of the spacer, from the upper surface or the side surface side of the printed wiring board A. And by inserting the bending parts to the through holes B1, the connecting pins contact the through holes B1 by the elastic force of the bending parts, and the two patterns of the printed wiring boards can be continued electrically each other.

[Claim(s)]

[Claim 1] A longitudinal hole of the shape of thin length formed in a sliding direction by penetrating, and a locking hole which is open for free passage from a one side face to this longitudinal hole, A spacer which becomes with insulation materials, such as a synthetic resin in which a groove which is open for free passage from the side also on the undersurface of said longitudinal hole was formed, A bend part turned up in the shape of a U character with elasticity, and a stopper part which one tip of this bend part is bent toward the outside, and is inserted in a locking hole in a both-sides end of said spacer, The 1st connecting pin that becomes with an elastic metal wire in which a vertical section which is vertically extended from another side of said bend part, and penetrates inside of said longitudinal hole was formed, A bend part turned up in the shape of a U character with elasticity, and a stopper part which a tip of another side of this bend part is bent toward the outside, and is inserted in a locking hole of said spacer, The 2nd connecting pin that becomes with an elastic metal wire in which a horizontal level which a tip end part of another side of said bend part is bent back, is inserted in said Groove, and projects back was formed, and a printed circuit board contact constituting more.

[Claim 2] A side hole of the shape of thin length formed in a cross direction by penetrating, and a locking hole which is open for free passage from the upper surface to this side hole, A spacer which becomes with insulation materials, such as a synthetic resin in which a groove which is open for free passage ranging from back to the undersurface to said side hole was formed, A bend part turned up in the shape of a U character with elasticity, and a stopper part which one tip of this bend part is bent toward the outside, and is inserted in a locking hole in a both-sides end of said spacer, The 1st connecting pin that becomes with

an elastic metal wire in which a vertical section which a tip end part of another side of said bend part is bent caudad, and is inserted in said Groove was formed, A bend part turned up in the shape of a U character with elasticity, and a stopper part which one tip of this bend part is bent toward the outside, and is inserted in a locking hole of said spacer, The 2nd connecting pin that becomes with an elastic metal wire in which a horizontal level which a tip end part of another side of said bend part is bent caudad, and is back bent over the bottom of said spacer, is inserted in said Groove, and projects back was formed, and a printed circuit board contact constituting more.

[Claim 3]A side hole of the shape of thin length formed in a cross direction by penetrating, and a locking hole which is open for free passage from the upper surface to this side hole, A spacer which becomes with insulation materials, such as a synthetic resin in which a groove which is open for free passage ranging from back to the undersurface to said side hole was formed, A bend part turned up in the shape of a U character with elasticity, and a stopper part which one tip of this bend part is bent toward the outside, and is inserted in a locking hole of said spacer, A connecting pin which becomes with an elastic metal wire in which a vertical section which a tip end part of another side of said bend part is bent caudad, and is inserted in said Groove was formed, and a printed circuit board contact constituting more.

#### [Detailed Description of the Invention]

[0001]

[Industrial Application]This invention is a contact for connecting the printed circuit board of two sheets, it is only inserting to the through hole formed in each printed circuit board, and two printed circuit boards are related with the printed circuit board contact which can electrically connect a pattern comrade in a sliding direction or a perpendicular direction.

[0002]

[Description of the Prior Art]In electronic equipment, when circuitry was caused intricately, since it became impossible to incorporate a circuit, the circuit was included in the printed circuit board of two sheets of main and sub, and the sub printed circuit board was accumulated on the main printed circuit boards with the printed circuit board of one sheet. And in order to connect the main the pattern comrade of the printed circuit board and sub, the contact as shown in drawing 12 and drawing 13 was used.

[0003]That is, in drawing 12, A is used as the main printed circuit board, B is used as a subprinted circuit board, and the through hole for flowing through the main printed circuit board A and the subprinted circuit board B is formed in each. C is used as a contact, it penetrates to spacer C<sub>1</sub> made of resin, and connecting pin C<sub>2</sub> is implanted.

[0004]And in order to connect the pattern of the main printed circuit board A and the subprinted circuit board B using this contact C, Insert in the through hole of the main printed circuit board A connecting pin C<sub>2</sub> projected to the spacer C<sub>1</sub> up side in the contact C, and soldering immobilization is carried out with a pattern on top, It can carry out by inserting in the through hole of the subprinted circuit board B connecting pin C<sub>2</sub> projected to the down side, and carrying out soldering immobilization with a pattern at the bottom.

[0005]On the other hand, the contact D in drawing 13 carries out soldering immobilization of the upper part connecting pin in male pin D<sub>1</sub> of the same structure as the above mentioned contact C in the upper surface of the main printed circuit board A, The bottom connecting pin of said male pin D<sub>1</sub> carries out soldering immobilization of the connecting

pin projected from the socket D<sub>2</sub> bottom which fits in enabling free attachment and detachment on the undersurface of the subprinted circuit board B.

[0006]And if it is in the above mentioned conventional example of drawing 12, structure is easy, but once it connects the two printed circuit boards A and B, the problem that it is very difficult to dissociate by repair etc. will arise. If it is in the conventional example of drawing 13, it has the advantage that the work of separating the two printed circuit boards A and B is easy.

[0007]

[Problem(s) to be Solved by the Invention]By the way, the point which is common in the two above mentioned conventional examples is fixing by soldering the connecting pin of connecting pin C<sub>2</sub> of the contact C, or male pin D<sub>1</sub> in the contact D, and the connecting pin of socket D<sub>2</sub> to the main printed circuit board A and the subprinted circuit board B.

[0008]Therefore, in order to connect the two printed circuit boards A and B, soldering work was always needed, the manufacturing process increased, and increase of cost was caused, and there was a problem that it became very troublesome to remove the contacts C and D.

[0009]The printed circuit boards A and B connected using the above mentioned contacts C and D could be connected though it had the above mentioned problem in the sliding direction, but the subprinted circuit board B was not able to be connected by a crossed state to the main printed circuit board A.

[0010]this invention -- said problem carried out -- it is going to solve -- the place which is a thing and is made into the purpose, The pattern comrade of the printed circuit board of two sheets is connectable according to elastic force only by inserting a connecting pin in the through hole of a printed circuit board, It is in using as an offer plug the printed circuit board contact which can connect patterns, without soldering other printed circuit boards by a crossed state to the printed circuit board of one sheet.

[0011]

[Means for Solving the Problem]A printed circuit board contact of this invention uses the problem as a solution plug, and the means comprises the following:

A longitudinal hole of the shape of thin length formed in a sliding direction by penetrating. A locking hole which is open for free passage from a one side face to this longitudinal hole.

A spacer which becomes with insulation materials, such as a synthetic resin in which a groove which is open for free passage from the side also on the undersurface of said longitudinal hole was formed.

A bend part turned up in the shape of a U character with elasticity, and a stopper part which one tip of this bend part is bent toward the outside, and is inserted in a locking hole in a both-sides end of said spacer, The 1st connecting pin that becomes with an elastic metal wire in which a vertical section which is vertically extended from another side of said bend part, and penetrates inside of said longitudinal hole was formed, A bend part turned up in the shape of a U character with elasticity, and a stopper part which a tip of another side of this bend part is bent toward the outside, and is inserted in a locking hole of said spacer, The 2nd connecting pin that becomes with an elastic metal wire in which a horizontal level which a tip end part of another side of said bend part is bent back, is inserted in said Groove, and projects back was formed.

[0012]A side hole of the shape of thin length formed in a cross direction by penetrating

and a locking hole which is open for free passage from the upper surface to this side hole, A spacer which becomes with insulation materials, such as a synthetic resin in which a groove which is open for free passage ranging from back to the undersurface to said side hole was formed, A bend part turned up in the shape of a U character with elasticity, and a stopper part which one tip of this bend part is bent toward the outside, and is inserted in a locking hole in a both-sides end of said spacer, The 1st connecting pin that becomes with an elastic metal wire in which a vertical section which a tip end part of another side of said bend part is bent caudad, and is inserted in said Groove was formed, A bend part turned up in the shape of a U character with elasticity, and a stopper part which one tip of this bend part is bent toward the outside, and is inserted in a locking hole of said spacer, A tip end part of another side of said bend part is bent caudad, and it is back bent over the bottom of said spacer, and may constitute from the 2nd connecting pin that becomes with an elastic metal wire in which a horizontal level which is inserted in said Groove and projects back was formed.

[0013]A side hole of the shape of thin length formed in a cross direction by penetrating and a locking hole which is open for free passage from the upper surface to this side hole, A spacer which becomes with insulation materials, such as a synthetic resin in which a groove which is open for free passage ranging from back to the undersurface to said side hole was formed, A bend part turned up in the shape of a U character with elasticity, and a stopper part which one tip of this bend part is bent toward the outside, and is inserted in a locking hole of said spacer, A tip end part of another side of said bend part is bent caudad, and it may constitute from a connecting pin which becomes with an elastic metal wire in which a vertical section inserted in said Groove was formed.

[0014]

[Function]Since the printed circuit board contact of this invention is constituted as described above, insert in the through hole of a printed circuit board the vertical section of the 1st connecting pin caudad projected from the lower end surface of the both-sides end of a spacer, and soldering immobilization is carried out, Soldering immobilization of the horizontal level of the 2nd connecting pin projected from the lower end surface except the both-sides end of a spacer to back is carried out at the pattern of said printed circuit board, It can flow through the pattern comrade of the printed circuit board of two upper and lower sides electrically by inserting the through hole of other printed circuit boards in the bend part of said 1st and 2nd connecting pin projected from the upper part of said spacer.

[0015]Insert in the through hole of a printed circuit board the vertical section of the 1st connecting pin caudad projected from the lower end surface of the both-sides end of a spacer, and soldering immobilization is carried out, Soldering immobilization of the horizontal level of the 2nd connecting pin projected from the lower end surface except the both-sides end of a spacer to back is carried out at the pattern of said printed circuit board, It can flow through the pattern comrade of two printed circuit boards stationed in the direction which intersects perpendicularly electrically by inserting the through hole of other printed circuit boards in the bend part of said 1st and 2nd connecting pin projected from the front of said spacer.

[0016]Insert in the through hole of a printed circuit board the vertical section of the connecting pin caudad projected from the lower end surface of the both-sides end of a spacer, and soldering immobilization is carried out, By inserting the through hole of other printed circuit boards in the bend part of said connecting pin projected from the front of

said spacer, it can flow through the pattern comrade of two printed circuit boards stationed in the direction which intersects perpendicularly electrically.

[0017]

[Example] Hereafter, the 1st example of the printed circuit board contact concerning this invention is described with drawing 1 - drawing 4. 1 is used as the elongated-shaped spacer constituted with insulation materials, such as a synthetic resin, The locking hole 1b which the long and slender-shaped longitudinal hole 1a is penetrated and formed in a sliding direction for every constant interval, and carries out an opening ahead from the approximately center of this longitudinal hole 1a is formed, and the groove 1c which is open for free passage to said longitudinal hole 1a ranging from the back to the undersurface is formed further.

[0018] 2 is used as the 1st connecting pin constituted with elastic metal wires, such as copper wire, and the bend part 2a turned up in the shape of a U character with elasticity, stopper part 2b which was turned up from this bend part 2a, and bent the tip toward the outside, and the vertical section 2c extended from said bend part 2a are formed.

[0019] The bend part 3a which used 3 as said 1st connecting pin 5 and the 2nd connecting pin by the same material, and was turned up in the shape of a U character with elasticity, The stopper part 3b which bent the tip turned up from this bend part 3a toward the front, and the horizontal level 2c which bent the tip extended from said bend part 3a toward back are formed.

[0020] and the state where inserted into the longitudinal hole 1a of the both-sides end in said spacer 1, and stopper part 2b was located in said locking hole 1b where it resisted elastic force and the bend part 2a of said 1st connecting pin 2 carried out is contracted -- said -- it contracts and power is canceled. Then, stopper part 2b is inserted by the elastic force of the bend part 2a into the locking hole 1b, and the 1st connecting pin 2 is fixed in the spacer 1. In this state, the vertical section 2c is caudad projected from the longitudinal hole 1a.

[0021] Subsequently, it inserts into other longitudinal holes 1a except the longitudinal hole 1a of said both-sides end in reduced and the spacer 1 which were contracted similarly with having described above the bend part 3a of the 2nd connecting pin 3, and the stopper part 3b is inserted into the locking hole 1b. The horizontal level 3c is inserted in the groove 1c formed in the undersurface of the spacer 1 in this state.

[0022] In order to connect the printed circuit boards A and B of two sheets which use the printed circuit board contact concerning this design constituted in this way, and are shown in drawing 1 and drawing 4, First, soldering immobilization of the horizontal level 3c of the 2nd connecting pin 3 is carried out at pattern A<sub>1</sub> which the vertical section 2c of the 1st connecting pin 2 was inserted in the through hole formed in the printed circuit board A, carried out soldering immobilization in the rear face, and was formed in said printed circuit board A.

[0023] Thus, through hole B<sub>1</sub> of the printed circuit board B is close brought from the upper part to the bend parts 2a and 3a projected from the upper part of the spacer 1 of the 1st and 2nd connecting pin 2 and 3 fixed to the printed circuit board A, and it inserts until the rear face of this printed circuit board B contacts the upper surface of the spacer 1. In this state, since it tries to spread according to the elastic force of the bend parts 2a and 3a, these bend parts 2a and 3a are welded by pressure to through hole B<sub>1</sub> of the printed circuit board B. Therefore, pattern A<sub>1</sub> of the printed circuit boards A and B of two sheets and B<sub>2</sub> are

electrically connected by the 1st and 2nd connecting pin 2 and 3.

[0024]Next, the 2nd example is described with drawing 5 - drawing 8. 4 is used as the elongated-shaped spacer constituted with insulation materials, such as a synthetic resin, The locking hole 4b which the long and slender-shaped side hole 4a is penetrated and formed in a sliding direction for every constant interval, and carries out an opening to the upper part from the approximately center of this longitudinal hole 4a is formed, and the groove 4c which is open for free passage to said side hole 4a ranging from the back to the undersurface is formed further.

[0025]5 is used as the 1st connecting pin constituted with elastic metal wires, such as copper wire, and the bend part 4a turned up in the shape of a U character with elasticity, the stopper part 4b which was turned up from this bend part 4a, and bent the tip toward the outside, and the vertical section 4c which was extended from said bend part 4a, and was bent caudad are formed.

[0026]The bend part 6a which used 6 as said 1st connecting pin 5 and the 2nd connecting pin by the same material, and was turned up in the shape of a U character with elasticity, The stopper part 6b which bent the tip turned up from this bend part 6a toward the front, and the horizontal level 6c bent so that the portion extended from said bend part 6a might be bent in the shape of a Z character and a tip might go back are formed.

[0027]and the state where inserted into the side hole 4a of the both-sides end in said spacer 4, and the stopper part 5b was located in said locking hole 4b where it resisted elastic force and the bend part 5a of said 1st connecting pin 5 carried out is contracted -- said -- it contracts and power is canceled. Then, the stopper part 5b is inserted by the elastic force of the bend part 5a into the locking hole 4b, and the 1st connecting pin 5 is fixed in the spacer 4. In this state, the vertical section 5c is caudad projected from the groove 4c.

[0028]Subsequently, it inserts into other side holes 4a except the side hole 4a of said both-sides end in reduced the spacer 4 which were contracted similarly with having described above the bend part 6a of the 2nd connecting pin 6, and the stopper part 6b is inserted into the locking hole 4b. In this state, the horizontal level 6c is inserted along the groove 4c formed in the undersurface of the spacer 4.

[0029]In order to connect the printed circuit boards A and B of two sheets which use the printed circuit board contact concerning this design constituted in this way, and are shown in drawing 5 and drawing 8, First, soldering immobilization of the horizontal level 6c of the 2nd connecting pin 6 is carried out at pattern A<sub>1</sub> which the vertical section 5c of the 1st connecting pin 5 was inserted in the through hole formed in the printed circuit board A, carried out soldering immobilization in the rear face, and was formed in said printed circuit board A.

[0030]Thus, through hole B<sub>1</sub> of the printed circuit board B is close brought from the front to the bend parts 5a and 6a projected from the front of the spacer 4 of the 1st and 2nd connecting pin 5 and 6 fixed to the printed circuit board A, and it inserts until the rear face of this printed circuit board B contacts the front face of the spacer 4. In this state, since it tries to spread according to the elastic force of the bend parts 5a and 6a, these bend parts 5a and 6a are welded by pressure to through hole B<sub>1</sub> of the printed circuit board B. Therefore, pattern A<sub>1</sub> of the printed circuit boards A and B of two sheets and B<sub>2</sub> are electrically connected by the 1st and 2nd connecting pin 5 and 6.

[0031]Next, the 3rd example is described with drawing 9 - drawing 11. The connecting pin in this example is the same as the 1st connecting pin 5 in said 2nd example, and forms the

depth of the groove 4c shallowly as the spacer 4. And the vertical section 5c of the connecting pin 5 is inserted to the through hole formed in the printed circuit board A, and it solders and fixes on the undersurface.

[0032]Therefore, when connecting the printed circuit board B to the printed circuit board A, like the last 2nd example, the printed circuit board B is close brought from a perpendicular direction to the printed circuit board A, and the bend part 5b of the connecting pin 5 is inserted in through hole B<sub>1</sub> of the printed circuit board B. Pattern A<sub>1</sub> of the printed circuit boards A and B of two sheets and B<sub>2</sub> are electrically connected with the connecting pin 5 by this.

[0033]In each above mentioned example, in the state where it inserted into through hole B<sub>1</sub> of the printed circuit board B, it is necessary to take into consideration enough the length of this stopper part 2b, and 3b, 5b and 6b so that stopper part 2b, and 3b, 5b and 6b escape from it and may not come out from the locking holes 1b and 4b. If it was in the above mentioned example, the thing long as the spacers 1 and 4 was shown, but one independent thing may be used, and it may be cut and used for a suitable pole.

[0034]

[Effect of the Invention]As opposed to the bend part of the connecting pin which carried out soldering immobilization of the vertical section or horizontal level of a connecting pin projected from the spacer at the printed circuit board, and has been projected from the upper surface or the side of a spacer in this invention as described above, The through hole of other printed circuit boards is close brought from the upper surface or the side face direction of said printed circuit board, and this bend part is inserted in a through hole. Therefore, since a connecting pin can contact a through hole and fitness and can make it flow through the pattern comrade of two printed circuit boards electrically according to the elastic force which a bend part has, In repair of a printed circuit board etc., two printed circuit boards can be separated easily, and arrangement connection of the two printed circuit boards is made to the upper and lower sides or a perpendicular direction.

[0035]Since between two patterns of a request of a printed circuit board is simultaneously connectable by constituting a spacer in one continuously and inserting a connecting pin in all in each spacer, or a desired number, It has effects -- flexibility increases to the design pattern of a printed circuit board, and it is easy to treat to it.

[Brief Description of the Drawings]

[Drawing 1]It is a perspective view showing the state of connecting the printed circuit boards of the 1st example.

[Drawing 2]It is drawing of longitudinal section of an end same as the above.

[Drawing 3]It is drawing of longitudinal section of the center portion of drawing 1.

[Drawing 4]It is a side view of drawing 1.

[Drawing 5]It is a perspective view showing the state of connecting the printed circuit boards of the 2nd example.

[Drawing 6]It is drawing of longitudinal section of an end same as the above.

[Drawing 7]It is drawing of longitudinal section of the center portion of drawing 1.

[Drawing 8]It is a side view of drawing 5.

[Drawing 9]It is a perspective view showing the state of connecting the printed circuit boards of the 3rd example.

[Drawing 10]It is drawing of longitudinal section same as the above.

[Drawing 11]It is a side view of drawing 9.

[Drawing 12] It is a side view showing the connected state of the printed circuit board contact in the former.

[Drawing 13] It is a side view showing the connected state of other conventional examples.

[Description of Notations]

1 and 4 Spacer

1a Longitudinal hole

1b and 4b Locking hole

2 and 5 The 1st connecting pin

2a and 5a Bend part

2b, 5b stopper part

2c and 5c Vertical section

3 and 6 The 2nd connecting pin

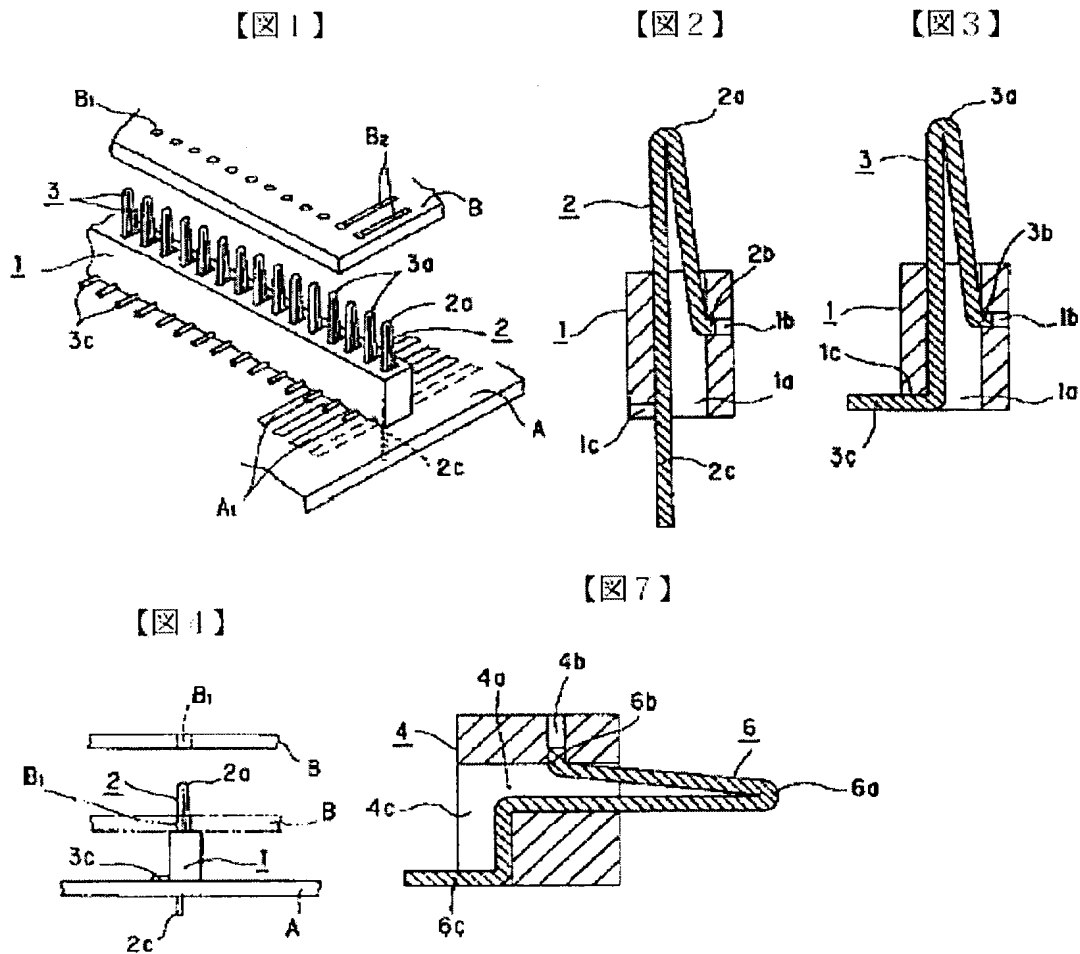
3a and 6a Bend part

3b, 6b stopper part

3c and 6c Horizontal level

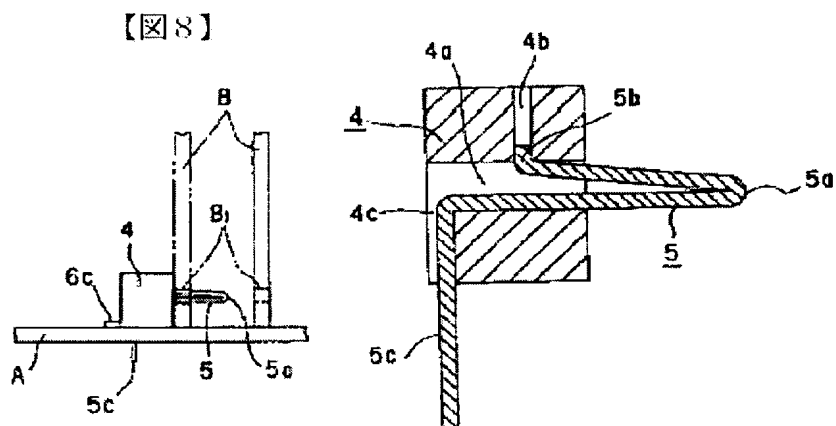
4a Side hole

4c Groove

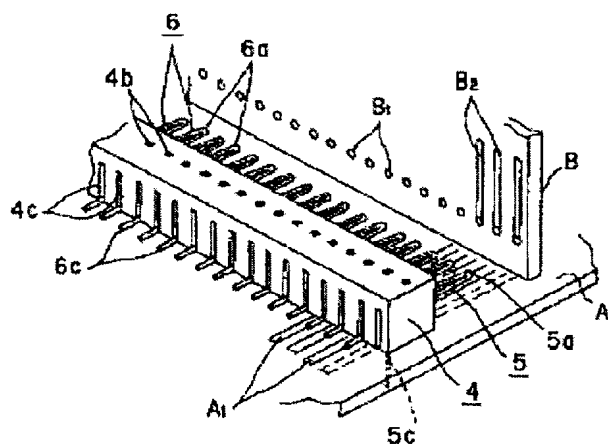




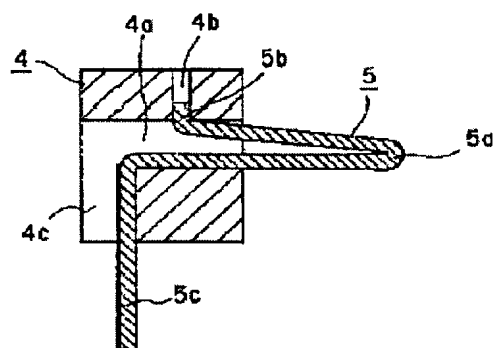
【図10】



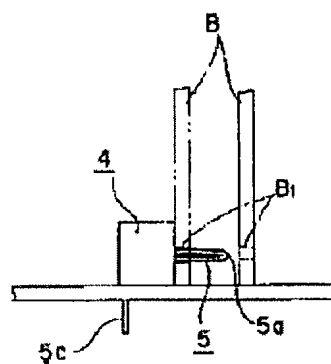
【図5】



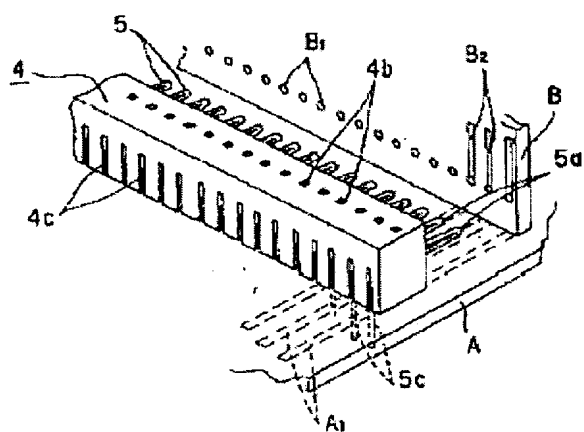
【図6】



【図11】



【図9】



【図 13】

